

PENT COOPERATION TRE

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

Date of mailing (day/month/year) 21 novembre 2001 (21.11.01)
Applicant's or agent's file reference IRI05294
International application No. PCT/US00/17578

To:
MOTOROLA, INC. Intellectual Property Department AZ 11/56-238 3102 North 56th Street Phoenix, AZ 85018 ETATS-UNIS D'AMERIQUE

1. The following indications appeared on record concerning: <input type="checkbox"/> the applicant <input type="checkbox"/> the inventor <input checked="" type="checkbox"/> the agent <input type="checkbox"/> the common representative				
Name and Address INGRASSIA, Vincent, B. Motorola, Inc. P.O. Box 10219 Scottsdale, AZ 85271-0219 United States of America	State of Nationality		State of Residence	
	Telephone No.		480/441-4141	
	Facsimile No.		480/441-5220	
	Teleprinter No.			

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning: <input type="checkbox"/> the person <input type="checkbox"/> the name <input checked="" type="checkbox"/> the address <input type="checkbox"/> the nationality <input type="checkbox"/> the residence				
Name and Address MOTOROLA, INC. Intellectual Property Department AZ 11/56-238 3102 North 56th Street Phoenix, AZ 85018 United States of America	State of Nationality		State of Residence	
	Telephone No.		602-952-4399	
	Facsimile No.		602-952-4376	
	Teleprinter No.			

3. Further observations, if necessary:				

4. A copy of this notification has been sent to: <input checked="" type="checkbox"/> the receiving Office <input type="checkbox"/> the designated Offices concerned <input type="checkbox"/> the International Searching Authority <input checked="" type="checkbox"/> the elected Offices concerned <input checked="" type="checkbox"/> the International Preliminary Examining Authority <input type="checkbox"/> other:				
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The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Sean Taylor Telephone No.: (41-22) 338.83.38
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004472661

**REPLACED BY
ART 34 AMDT**

-18-

Claims

What is claimed is:

- 5 1. A communications link for a cellular communications system, comprising:
 a first airplane for flying in a first pattern and including a first antenna for transmitting RF beams to form a first footprint on a first target geographic area to provide cellular phone users within the footprint with a first communications link;
- 10 10. a second airplane for flying in a second pattern and including a second antenna for transmitting RF beams to form a second footprint on a second target geographic area to provide cellular phone users within the second footprint with a second communications link;
 said first and second airplane flying in the first and second patterns each at an altitude below a high altitude level;
 said first and second patterns being varied to enable the first and second airplane to provide continuous uninterrupted coverage via first and second beam patterns, respectively, to a service area below in a weather pattern-independent and geographic feature-independent manner.
- 15 20. 2. The communications link of claim 1, further comprising a first airport located away from a center of a coverage area of the first and second airplane corresponding to a glide-down distance of the first and second airplane.
- 25 25. 3. The communications link of claim 2, further comprising a second airport for providing services generally redundant to those at the first airport, the second airport being situated at a location that is accessible to the first and second airplane.
- 30 30. 4. The communications link of claim 3, further comprising a third airplane located at one of the first and second airports for providing coverage redundant to that of the first and second airplanes.

-19-

5. The communications link of claim 1, wherein the first and second airplanes comprise a first airborne coverage group, and further comprising at least one other airborne coverage group for providing services generally redundant to those of the first airborne coverage group.

5

6. The communications link of claim 1, wherein the first and second airplanes fly at the same altitude.

10 7. The communications link of claim 1, wherein the first and second airplanes fly at different altitudes.

8. The communications link of claim 1, wherein altitudes of the first and second airplanes vary according to link margin requirements.

15 9. The communications link of claim 1, wherein the respective first and second patterns of the first and second airplanes are located at altitudes between 15,000 and 60,000 feet.

20 10. The communications link of claim 9, wherein the respective first and second patterns of the first and second airplanes are located at an altitudes of approximately 30,000 feet.

25 11. The communications link of claim 1, wherein at least one of the first and second airplanes is for adjusting the first and second flight patterns, respectively, so that at least one of the first and second beam patterns is capable of circumventing a storm.

30 12. The communications link of claim 1, wherein the first airplane is for handing off calls to the second airplane when necessary to provide the continuous uninterrupted communications coverage.

-20-

13. An airborne link for a cellular communications system, comprising:
a first airplane for transmitting RF beams to provide communications coverage
within a first beam footprint covering a specified geographic area;

5 first airplane by establishing a flight pattern and a second beam footprint that
enables call switchover in a manner that minimizes dropped calls.

14. The airborne link of claim 13, further comprising a ground control
station for directing the call switchover when the second airplane establishes a call
10 switchover rendezvous flight pattern.

15. The airborne link of claim 14, wherein the ground control station
gradually switches over calls within the first beam footprint to the second beam
footprint by gradually reducing output power associated with the first beam footprint
15 to cause user handsets to switch to the second beam footprint.

16. The airborne link of claim 13, wherein the first airplane initiates the call
switchover by gradually reducing output power associated with the first beam
footprint to cause user handsets to switch to the second beam footprint.

20

17. The airborne link of claim 13, wherein the first and second flight
patterns are one of parallel flight patterns and 180° out-of-phase flight patterns.

18. A method of switching calls over from an original airplane-based
25 communications link in a cellular communications system to a replacement
airplane-based communications link, comprising:

maintaining a first airplane in a first flight pattern to provide continuous
coverage over a designated geographic area through a first communications link;

30 flying a second airplane up to a predetermined flight pattern to establish a
second communications link over the designated geographic area;

moving calls carried on the first communications link to the second
communications link according to a predetermined switchover protocol; and

flying the first airplane out of the first flight pattern after all of the calls have
been switched over to the second communications link.

19. The method of claim 18, wherein the moving of calls is a ground control-based operation.

5 20. The method of claim 18, wherein the moving of calls is a power control-based operation in which power of the first communications link is gradually reduced to enable calls on the first communications link to be gradually handed off to the second communications link.

10 21. The method of claim 18, wherein the moving of calls is a split spectral resources-based operation in which a percentage of spectral resources assigned to the second communications link is gradually increased until 100% of all spectral resources are assigned to the second communications link.

15 22. A method of providing cellular communications coverage using an airplane based antenna array, comprising:

establishing cellular communications coverage over a predetermined geographic area via a first generally circular flight pattern with an outer point thereof being tangential to a circumscribing flight pattern circle having a radius larger than
20 that of the first flight pattern;

if a weather pattern affects the communications coverage, moving from the first flight pattern along the circumscribing flight pattern circle until a new operating point corresponding to a point of an alternate flight pattern that is tangential to the circumscribing flight pattern is reached; and

25 executing the alternate flight pattern having a radius similar to the first flight pattern to maintain the cellular communications coverage over the predetermined geographic area.

30 23. The method of claim 22, further comprising adjusting the cellular communications coverage during the moving from the first flight pattern to maintain the cellular communications coverage over the predetermined geographic area.

-22-

24. The method of claim 23, wherein the moving from the first flight pattern further comprises at least one of turning beams providing the cellular communications coverage on/off and re-shaping the beams providing the cellular communications coverage.

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25. The method of claim 22, wherein the moving from the first flight pattern is an airplane-based function.

26. The method of claim 22, wherein the moving from the first flight
10 pattern is a terrestrial-based function.

PATENT COOPERATION TREATY

22/10

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference IRI05294	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US00/17578	International filing date (day/month/year) 26 June 2000 (26.06.2000)	Priority date (day/month/year) 13 September 1999 (13.09.1999)
International Patent Classification (IPC) or national classification and IPC IPC(7): HO4Q 7/00; HO4L 12/56; B64G 1/10 and US Cl.: 455/431, 11.1, 13.1, 427		
Applicant MOTOROLA INC.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>5</u> sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 		

Date of submission of the demand 11 April 2001 (11.04.2001)	Date of completion of this report 30 August 2001 (30.08.2001)
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer William Trost Telephone No. 703 306-0377

Form PCT/IPEA/409 (cover sheet)(July 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/17578

I. Basis of the report

1. With regard to the elements of the international application:*

 the international application as originally filed. the description:

pages 1-17 as originally filed

pages NONE, filed with the demandpages NONE, filed with the letter of _____ the claims:pages NONE, as originally filedpages NONE, as amended (together with any statement) under Article 19pages NONE, filed with the demandpages 18-22, filed with the letter of 15 August 2001 (15.08.2001) the drawings:

pages 1-9, as originally filed

pages NONE, filed with the demandpages NONE, filed with the letter of _____ the sequence listing part of the description:pages NONE, as originally filedpages NONE, filed with the demandpages NONE, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

 the language of a translation furnished for the purposes of international search (under Rule 23.1(b)). the language of publication of the international application (under Rule 48.3(b)). the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

 contained in the international application in printed form. filed together with the international application in computer readable form. furnished subsequently to this Authority in written form. furnished subsequently to this Authority in computer readable form. The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished. The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.4. The amendments have resulted in the cancellation of: the description, pages NONE the claims, Nos. NONE the drawings, sheets/fig NONE5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

WRITTEN OPINIONInternational Application No.
PCT/US00/17578**V. Reasoned statement under Rule 66.2(a)(II) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. STATEMENT**

Novelty (N)	Claims <u>1-25</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>21-25</u>	YES
	Claims <u>1-20</u>	NO
Industrial Applicability (IA)	Claims <u>1-25</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

Please See Continuation Sheet

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

V. 2. Citations and Explanations:

Regarding claim 14, Martin discloses a ground control station (fig.2) for switching over service.

2. Claims 1-13,16-18 lack an inventive step under PCT Article 33(3) as being obvious over Martin et al. (WO 99/23769) in view of Hansell et al. (2,627,021).

Regarding claims 1, 12, Martin discloses three aircrafts flying eight hour missions each can provide continuous communication capabilities to service region 16 (fig.1, pages 7 lines 1-4), each aircraft transmits beams to cover a service area (fig.1). the examiner takes an official notice that, the aircraft in the Martin reference can fly at an altitude of between 52,000 and 60,000 feet. So, it can fly at below a high altitude level and can be used in different weather which is known in the art of using the aircraft-based communication service (page 8 lines 20-33). However, Martin fails to disclose the flight patterns of aircraft at less than 50,000 feet. Hansell discloses a communication aircraft having a plurality of aircraft flying patterns of 250 miles apart, each flies at 10,000 to 15,000 feet or higher. It would have been obvious to one skilled in the art at the time the invention was made to have Martin, modified by Hansell in order to prevent interruption of the communication service.

Regarding claims 2-4, It is noted that it is inherent to have airports to support the aircraft-based communication system as well as to have a reserved aircraft to substitute a servicing aircraft in case of malfunctioning of the servicing aircraft. the motivation being that it provides communication service in the coverage area without interrupted.

Regarding claims 5-10, Martin discloses the aircraft-base communication system for covering different groups at any suitable orbit to maintain service on the service region (page 6 line 25-34, fig.1).
(Continued on Supplemental Sheet.)

TIME LIMIT:

The time limit set for response to a Written Opinion may not be extended. 37 CFR 1.484(d). Any response received after the expiration of the time limit set in the Written Opinion will not be considered in preparing the International Preliminary Examination Report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US00/17578

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

V. 2. REASoNED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

regarding claims 11 and 18, Martin discloses the aircrafts adjust the flight patterns to circumvent a storm (page 8 lines 20-32).

regarding claim 13, Martin discloses a ground control station (fig.2) for switching over service.

Regarding claim 16, Martin discloses three-aircraft-based communication system in which each aircraft flies at parallel flight patterns and 180 degrees out-of-phase flight patterns (fig.1).

regarding claim 17, this claim lacks inventive step as set forth in claim 1, as method

3. Claims 14-15, 19-20 lack an inventive step under PCT Article 33(3) as being obvious over Martin et al. in view of Hansell et al. (2,627,021) and further in view of Rouffet et al. (5,625,867).

regarding claims 14-15, 19-20, Martin and Hansell do not teach the step of adjusting power levels of the aircrafts in case of a switch over.

Rouffet discloses a handoff in a satellite based system in which as the quality of service provided satellites 28 are deteriorating, terminals 25, 26 are handed off from a first satellite to a second satellite (column 5 lines 33-55, figs. 4-5), the motivation being that it prevents dropped calls.

3. Claims 21-25 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest.

Regarding claims 22-26, the prior art of record failed to disclose that in case of bad weather, moving from a first flight pattern along the circumscribing light pattern circle until a new operating point corresponding to a point of an alternate flight pattern that is tangential to the circumscribing flight pattern is reached.

-----NEW CITATIONS-----

WO 009923769 A1 (MARTIN et al) 14 May 1999
US 5,625,867 A (ROUFFET et al) 29 April 1997
US 2,627,021 A (HANSELL et al) 27 January 1953

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PATENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference IRI05294	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 00/ 17578	International filing date (day/month/year) 26/06/2000	(Earliest) Priority Date (day/month/year) 13/09/1999
Applicant MOTOROLA INC.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
 - contained in the international application in written form.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority in written form.
 - furnished subsequently to this Authority in computer readable form.
 - the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
 - the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. Certain claims were found unsearchable (See Box I).

3. Unity of Invention is lacking (see Box II).

4. With regard to the title,

- the text is approved as submitted by the applicant.
- the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- the text is approved as submitted by the applicant.
- the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

- as suggested by the applicant.
- because the applicant failed to suggest a figure.
- because this figure better characterizes the invention.

1&4

None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/17578

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 H04B7/185 H01Q1/28 H01Q21/29

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04B H01Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 99 23769 A (RAYTHEON) 14 May 1999 (1999-05-14) page 2, line 31 -page 5, line 29 page 6, line 25 -page 7, line 15 page 10, line 30 -page 11, line 4 page 14, line 24 -page 18, line 4; figures 1-7	1, 13, 18, 22
A	---	2-12, 14-17, 19-21, 23-26
Y	WO 95 04407 A (INTERNATIONAL MULTI-MEDIA) 9 February 1995 (1995-02-09) page 5, line 24 -page 7, line 24 page 9, line 1 -page 10, line 22 page 15, line 19 -page 16, line 12 page 17, line 24 -page 18, line 14 figures 1,5A-7B	1, 13, 18, 22
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search Date of mailing of the international search report

31 October 2000

08/11/2000

Name and mailing address of the ISA
 European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
 Fax: (+31-70) 340-3016

Authorized officer

Angrabeit, F

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/17578

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2 598 064 A (LINDENBLAD) 27 May 1952 (1952-05-27) column 1, line 32 -column 3, line 26; figure 1 ---	1,13
A	EP 0 837 567 A (BOEING) 22 April 1998 (1998-04-22) page 4, line 21 - line 52; figures 1,2,5,10,11 ---	1,13
A	US 2 748 266 A (BOYD) 29 May 1956 (1956-05-29) column 6, line 30 -column 10, line 29; figures 3A-5C ---	1,13
A	US 2 626 348 A (NOBLES) 20 January 1953 (1953-01-20) column 14, line 40 -column 15, line 27; figures 1,5,6 ----	1,13
A	US 5 067 172 A (SCHLOEMER) 19 November 1991 (1991-11-19) the whole document -----	1,13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/17578

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 9923769	A	14-05-1999	US	6061562 A	09-05-2000
			AU	1079399 A	24-05-1999
			EP	1027775 A	16-08-2000
WO 9504407	A	09-02-1995	AT	185659 T	15-10-1999
			AU	685149 B	15-01-1998
			AU	7365494 A	28-02-1995
			BR	9407157 A	17-09-1996
			CA	2168353 A	09-02-1995
			CN	1132008 A	25-09-1996
			DE	4495639 T	31-10-1996
			DE	69421184 D	18-11-1999
			DE	69421184 T	24-08-2000
			EP	0711476 A	15-05-1996
			ES	2113814 A	01-05-1998
			ES	2141244 T	16-03-2000
			FR	2712128 A	12-05-1995
			GB	2296634 A, B	03-07-1996
			GR	3032336 T	27-04-2000
			IT	RM940510 A	30-01-1995
			JP	9503892 T	15-04-1997
			PL	313220 A	10-06-1996
			PT	711476 T	28-04-2000
US 2598064	A	27-05-1952	NONE		
EP 0837567	A	22-04-1998	US	6018659 A	25-01-2000
			JP	10150401 A	02-06-1998
US 2748266	A	29-05-1956	NONE		
US 2626348	A	20-01-1953	NONE		
US 5067172	A	19-11-1991	NONE		